

## RESEARCH OUTPUTS / RÉSULTATS DE RECHERCHE

### **An expert system for drafting contractual documents in Public Administration Procurement Operations**

Brouwers, Dominique; Gerard, Jacques; Montero, Etienne

*Published in:*  
Database and Expert Systems Applications

*Publication date:*  
1990

*Document Version*  
Publisher's PDF, also known as Version of record

[Link to publication](#)

*Citation for pulished version (HARVARD):*  
Brouwers, D, Gerard, J & Montero, E 1990, 'An expert system for drafting contractual documents in Public Administration Procurement Operations', *Database and Expert Systems Applications*, pp. 296-298.

#### **General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

#### **Take down policy**

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

# **An expert system for drafting contractual documents in Public Administration Procurement Operations**

Dominique BROUWERS, Jacques GERARD, Etienne MONTERO,  
Centre de Recherches Informatique et Droit, Facultés Universitaires Notre-Dame de la Paix,  
Rempart de la Vierge, 5 5000 Namur Belgium  
Tél. 32 - 81.72.47.71  
Telex FAC.NAM.B 59222 - Fax 32 - 81.22.88.58

## **Abstract**

This paper present a research project involved in legal expert system. The expertise domain concerns Public Procurement Market (PPM) in software acquisition. A very few civil servants have the necessary skill to combine public procurement regulations, data processing and computer law knowledge. The system should assist the Belgian administration in writing legal documents. During the consultation, the user can call several help-modules such as concept definition, reasoning justification power or can access a legal sources base.

## **Keywords**

Expert system- law- computer law - public procurement - software acquisition - drafting help  
- legal data base - prolog.

## **Introduction**

If the Belgian State plans to undertake public works (road, bridge, edifice,...), to acquire material (planes, office supplies,...), or services (engineering, architecture, ...), it must use a specific regulation. A statute (1976-07-14) defines the procedural and contractual rules in the elaboration and allocation of the Public Procurement Market (PPM).

The PPM may be considered as a written contract concluded by the administration to get the benefit of works, goods and services from a private company. The PPM regulation is based upon some fundamental principles : the obligation of advertising in order to allow free competition, the equality between tenderers, contract price, etc.

The statute of 1976 defines three procedures to conclude PPM : "adjudication" , "appel d'offres", "gré à gré". Only the last one permits the tenderer to negotiate. Furthermore, standard clauses must be included into the agreement, according to the statute.

## **Expertise domain : software acquisition**

In practice, the public administrations that want to computerize any activity are often unaware of some legal aspects. Three serious difficulties arise. The first difficulty includes three points (i) (ii) (iii) :

(i) The PPM regulations are relatively unsuited for data processing market. The 1976 Statute is particularly appropriate for public works market because they are the more frequent operations. So the purchasers have an experience which is unsuited for the software market.

(ii) Softwares have such specific qualities that rules governing goods and services PPM do not fit in this area. Specifications about conventional goods and services (a bridge construction, helicopter purchase, guarding activity) are pre-established. Instead, in the area, tenderers are required to propose a solution to some problem (automatization of book-keeping, ...). Thus, it is not up to the administration to specify the technicalities of the problem solving.

(iii) Some procedures are ineffective as well. Only the most flexible procedure can be used. So there is a need to examine how the rules of public procurement -especially the rules of procedure- can apply to data processing procurement.

A second difficulty lies in the specificity of software acquisition. The clauses of the legal document are not sufficient for the administration. It must get a range of legal guarantees by the inscription of adequate clauses in the contract. Without the expertise in computer law, the administration is often forced to accept models of contract imposed by the software houses. The system proposes such adequate clauses to help the administration in concluding software contracts.

Of course, it is very important that the contract includes all the guarantees, combined with the technical and functional specifications.

The third problem is the difficulty to merge the different expertises which are : theoretical and practical public procurement knowledge, technical knowledge and computer law.

The "Centre de Recherches Informatique et Droit" has the necessary knowledge to undertake and develop an expert system in data processing PPM. Lawyers and computer scientists work together in study and development of legal expert systems.

Thanks to the numerous consultations, provided for administrations these last years, we acquired a good experience in data processing PPM.

## Formalization

The knowledge embodied into the base of the expert system was already partly formalized. A practical guide has been written by a lawyer [Mont 90], at the request of the Belgian administration. It includes a series of clauses that will be the starting point during the conception of the facts base.

The set of the questions to be examined when a public purchaser is preparing the contractual documents has been divided into 21 topics such as software performance, duration of the operations, maintenance, documentation, warranties, intellectual property,... During a complete consultation, every topic is inspected. However, the user can make the choice to consult only one or a few modules.

## The system flexibility

The typical user of the system is supposed to be a civil servant occasionally involved in the drafting of documents concerning a software PPM. It is likely that the user will neither be a lawyer nor a data-processing expert. But experienced writers will be helped by the system as well. For this kind of users, it works as a support of conception, thus accelerating the writing process of documents.

In general, the expert system is requested to be really flexible regarding the user's skill. As it will be shown in the following example, different help features are provided concerning questions or suggested clauses.

Here is an excerpt of a consultation, when the system is dealing with the problem of software maintenance :

Question	
What kind of maintenance do you want to consider ?	
Responses	
A - <b>Maintenance "correction"</b>	
B - Maintenance "legal adaptation"	
C - Maintenance "technical adaptation"	
D - Maintenance "evolution"	

<b>Help</b>
<b>Why</b>
<b>Selection</b>
<b>Yes</b>
<b>No</b>

The system's user asks for an explanation about the responses

Question						
What kind of maintenance do you want to consider ?						
<p>The maintenance "correction" tends to discard the errors or defaults of the software.</p> <p>The maintenance "adaptation" covers the modifications to do in the software relatively to the changes in the technical or legal environment.</p> <p>The maintenance "evolution" is intended to cover the new requests of the administration. The tenderer commits himself to answer by a price presentation.</p>	<table border="1"> <tr><td>Help</td></tr> <tr><td>Why</td></tr> <tr><td>Selection</td></tr> <tr><td>Yes</td></tr> <tr><td>No</td></tr> </table>	Help	Why	Selection	Yes	No
Help						
Why						
Selection						
Yes						
No						

The maintenance "correction" has been chosen; then the system proposes to insert into the contract document the following clause

Question						
Do you include the following clause "Can be considered as an error, every bug that issues in a software misfunctioning with respect to the functions laid down in this agreement" ?	<table border="1"> <tr><td>Help</td></tr> <tr><td>Why</td></tr> <tr><td>Selection</td></tr> <tr><td>Yes</td></tr> <tr><td>No</td></tr> </table>	Help	Why	Selection	Yes	No
Help						
Why						
Selection						
Yes						
No						

At any moment, deductions that have led up to a question or a result (clause) can be shown to the user

Question						
Do you include the following clause "Can be considered as an error, every bug that issues in a software misfunctioning with respect to the						
<p>This clause is proposed because you have chosen the maintenance "correction" that need a definition of the concept of error.</p>	<table border="1"> <tr><td>Help</td></tr> <tr><td>Why</td></tr> <tr><td>Selection</td></tr> <tr><td>Yes</td></tr> <tr><td>No</td></tr> </table>	Help	Why	Selection	Yes	No
Help						
Why						
Selection						
Yes						
No						

The user can ask for an explanation about the concept of "error"

Question						
<p>Because we want to avoid restrictive definition of the type : "misfunctioning with respect to the technical specifications of the software".</p> <p>The difficulty of this kind of definition is that it requires an exhaustive enumeration of all the specifications to protect the administration.</p> <p>It is better to adopt a functional definition of the errors.</p> <p>Thanks to this larger definition, the tenderer will be bound to bring all the corrections useful to the good functioning of the software.</p>	<p>error, ng to the</p> <table border="1"> <tr> <td><b>Help</b></td> </tr> <tr> <td><b>Why</b></td> </tr> <tr> <td><b>Selection</b></td> </tr> <tr> <td><b>Yes</b></td> </tr> <tr> <td><b>No</b></td> </tr> </table>	<b>Help</b>	<b>Why</b>	<b>Selection</b>	<b>Yes</b>	<b>No</b>
<b>Help</b>						
<b>Why</b>						
<b>Selection</b>						
<b>Yes</b>						
<b>No</b>						

At this stage, if the first explanation of a concept does not satisfy the user, he can consult the legal documentation (statutes, jurisprudence, doctrine). For this purpose, a data base containing all the relevant documents can be accessed at any time during the consultation. Then, it is up to the user to find the meaning of the debatable concept and therefore to make up his mind about selecting or rejecting a proposed clause. This way of working with the expert system is really close to the traditional lawyer's method who consults a range of reference texts before deciding to give any value or meaning to an ambiguous term. However, the preliminary search in the library, that can be tedious and time consuming, has already been done by the experts and the results are immediately accessible. The only remaining task for the user is to interpret the documents found into the data base. If the user has no law qualification, it can be dangerous to work with such a method because that task goes out of his depth. For that reason, a whole consultation can be carried out without going into the documentation base, just by following the first explanation. This one contains the interpretation considered as the mostly appropriate by the expert.

### **Conception and updating**

The shells used for expert systems are written for the applied domain and to the knowledges for which they are conceived. Furthermore, the limits fixed by the real world represented infer restrictions in the shells forms. It is not easy to abstract all the knowledge of a domain, even limited, and especially to precise the boundaries.

The legal domain in which we work does not differ. The implications of this arbitrary cutting are very difficult to assess. In fact, the representation of all the connections between the specified domain and the outer world will tend towards a complete real explanation.

We built a prototype with a shell written in Pascal. This shell was conceived to be used in an other legal activity, to determine public subsidies for companies [Scha 88, page 81]. This shell did not fit really well our new project because of the lack of text generation utilities. To realize the real system, we plan to write our own shell using the PROLOG language.

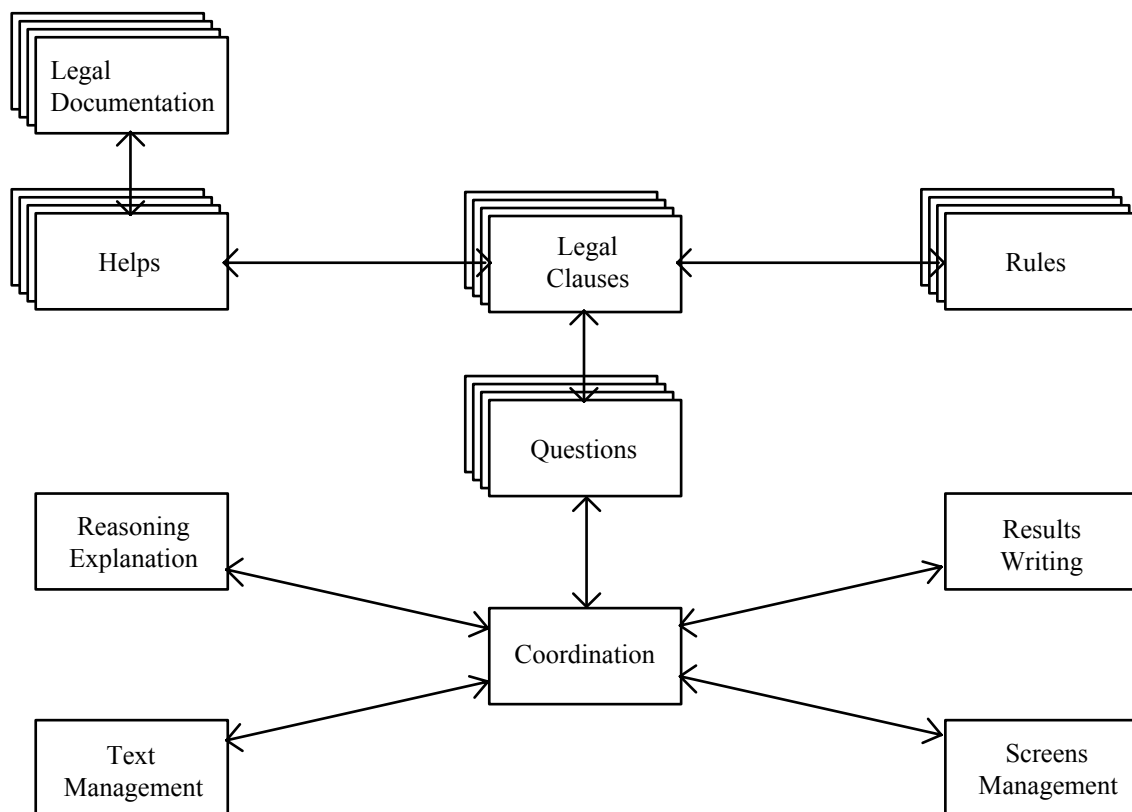
The "transfer" step of knowledge between experts in law and computer scientists, as enlightened before, takes a big part of the conception and realization time. The legal knowledge about contracts is quite easy to transform in logic rules of the second order, which need to be split up into Horn rules. These rules will be used for the real achievement. A team of both jurists and computer scientists carry out this part of the work to ensure a splitting

which does not alter legal clauses. Only the lawyers can establish if a separation need induced logical rules (such as compatibility or exclusive rules, ...).

The aim of splitting is twofold : an easy conception and a rational maintenance. By maintenance, we mean suppression, change of clauses or rules, adding new clauses or new rules which are induced by a modification of the showed real, updating the helps and the legal documentation.

No "self-maintenance" is considered for consistency reasons of the legal clauses.

Here is the decomposition which appears to be the most efficient for the shell construction:



The 21 legal topics fit with the modules outlined by several superimposed rectangles. Only this multiple modules must be modified in case of adaptation.

The PROLOG representation of the legal clauses is as follows :

*clse(X, Text, Modification, Help\_list, Documentation\_list).*

<X> is the clause name (must be identifier),

<Text> is the legal text of the clause,

<Modification> is a flag defining whether the clause belong to the base of facts or whether the original text was modified,

<Help\_list> is the list of helps available for the clause and,

<Documentation\_list> represents the list of "legal documentation" facts relative to the clause (basically jurisprudence). The *legal clauses* module is formed by the set of facts *clse*.

The helps and legal documentation are satisfied by 2-arity facts where the first argument is an identifier and the second, the text of help or documentation.

The rules govern the applicability of the different legal clauses and the questions allow to select applicable clauses by facts and rules adjunction in the work base. Every rule of compatibility between the existing clauses is embodied in this module. Using this method, the consequential effects of an incompatibility is inherent to the system.

The five simple modules can be used as soon as one of the 21 legal topics is designed. Firstly, the links between the legal parts can be simulated by a new set of questions which emerge from the facts that would be supposed to be imported from other modules.

These five modules compose the centre of the shell. They are partly independent of the subject. The mechanism required for a total and correct justification of the results issued from the system, is concentrated in the *reasoning explanation* module. The *text management* module allows the user an "a posteriori" modification of the clauses text that have been picked up. The two *results writing* and *screen management* modules are not specific to the expert systems. The nucleus of the shell is the *coordinating* module. It controls the consultations.



## Bibliography

FLAMME, M.-A., *Traité théorique et pratique des marchés publics*, tome I, Bruxelles, Bruylant, 1969, 1100 pages.

FLAMME, M.-A., *Traité théorique et pratique des marchés publics*, tome II, Bruxelles, Bruylant, 1969, 1100 pages.

FLAMME, M.-A., FLAMME, Ph., et MATHEI, Ph., *Commentaire pratique de la réglementation des marchés publics*, Bruxelles, Confédération des marchés publics, 1986, 1226 pages.

KOERS, A.W., KRACHT, D., SMITH, M., SMITS, J.M. et WEUSTEN, M.C.M., *Knowledge Based Systems in Law*, Kluwer, Deventer, 1989, 190 pages.

KOWALSKI, R., SERGOT, M., KRIWACZEK, F., HAMMOND, P., CORY, H., SADRI, F., The British Nationality Act as a Logic Program, *Communications of the ACM*, 1986, page 370-386.

MONTERO E., *Les marchés publics d'acquisition de logiciels*, à paraître, 185 pages.

SCHAUSS, M., *Systèmes experts et droit*, collection des Précis et travaux de la Faculté de droit de Namur, E. Story-Scientia, 1988, 182 pages.

STERLING, L. et SHAPIRO, E., *The art of PROLOG*, MIT Press, Cambridge, Massachusetts, 1986, 427 pages.

SUSSKIND, R., *Expert systems in law*, Clarendon Press, Oxford, 1987, 300 pages.

VON DER LIETH GARDNER, A., *An artificial intelligence approach to legal reasoning*, MIT Press, Cambridge, Massachusetts, 1987, 225 pages.